

REMARKS

A. Request for Reconsideration

Applicant has carefully considered the matters raised by the Examiner in the outstanding Office Action but remains of the position that patentable subject matter is present. Applicant respectfully requests reconsideration of the Examiner's position based on the Declaration of Mr. Nobumasa Sasa, the amendments to the specification, the amendments to the claims and the following remarks.

B. The Invention

The present invention is directed to an actinic ray curable ink having excellent storage stability and safety characteristics. In one of the novel aspects of the invention, the ink is composed of an oxetane compound and either an epoxidized fatty acid ester or an epoxidized fatty acid glyceride.

C. Claim Status and Amendments

Claims 1, 3-8 and 10-14 are presented for further prosecution. Claims 2 and 9 have been cancelled and claims 11-14 have been added by this amendment.

Claim 1 has been amended to recite that the ink is composed of an oxetane compound. Support for this amendment can be found in claim 2, now cancelled. The remaining subject matter of claim 2 directed to the initiator has been presented as new claim 11.

Claim 1 has also been amended to recite the viscosity of the ink. Support for this amendment can be found on page 18, lines 9-11 of the application.

Claims 12 and 13 have been added to further define the oxetane compound of the invention. Support for these claims can be found in the paragraph bridging pages 7 and 8.

New method claim 14 recites the step of ejecting the ink of claim 1 through an ink jet head. Support for this claim can be found on page 22, lines 1-7.

D. Specification Amendments

Pages 5 and 6 of the application have been amended to correct a typographical error with respect to the viscosity. Support for this correction can be found on page 18, lines 9-11.

E. The Office Action

Claims 1 and 4 had been rejected as being anticipated by Sakai (JP 02-022370). Claims 1, 2 and 4-10 had been rejected as being anticipated by Takabayashi (US 2004/0052968). Claims 1, 2, 4-6, 8 and 10 had been rejected as being anticipated by Herrmann (US 6,332,943). Claims 1, 4-6, 9 and 10 had been rejected as being anticipated by Sato (US 2003/0054103). Claims 1, 4-6 and 8-10 had been rejected as being anticipated by Roth (US 5,889,084). Claims 1-8 and 10 had been rejected as being anticipated by Watanabe (US 6,783,840). Claims 1, 3-6 and 10 had been rejected as being anticipated by Fujioka (US 4,012,559). Claims 2 and 7 had been rejected as being unpatentable over any of Herrmann, Sato or Roth, in view of Watanabe. Claim 2 had been rejected as being unpatentable over any of Sakai, Herrmann or Roth, in view of Maeda (US 6,332,439).

1. The foreign priority date of the present invention is prior to the US filing date of Takabayashi

The November 22, 2002 Japanese priority date of the present invention is prior to the August 25, 2003 US filing date of Takabayashi. Applicant has enclosed a certified English translation of the Japanese priority document to perfect the claim of priority and to remove Takabayashi as prior art.

Support for the claims of the present invention can be found in the following portions of the priority document:

claim 1	-	claims 1, 2 and 4
claim 3	-	par. 23
claim 4	-	par. 24
claim 5	-	par. 25
claim 6	-	par. 25
claim 7	-	par. 20
claim 8	-	par. 30
claim 10	-	claim 5
claim 11	-	claim 2
claim 12	-	par. 27
claim 13	-	par. 27
claim 14	-	par. 58

It is therefore respectfully submitted that the claimed invention is supported by the priority document and that Takabayashi is no longer prior art. Thus, the rejection of claims 1, 2 and 4-10 based on Takabayashi is no longer applicable.

2. The oxetane compound of the present invention is not taught by Sakai, Hermann, Sato, Roth or Fujioka

Claim 1 has been amended to add the limitation of claim 2, thus reciting that the ink is composed of an oxetane compound. It is therefore believed that the anticipation rejections based on Sakai, Sato, Roth and Fujioka have been overcome, since Takabayashi has been removed as prior art and since Sakai, Hermann, Sato, Roth and Fujioka have not been cited against claim 2.

Hermann had been cited against claim 2, however, a review of Hermann shows that Hermann does not teach the addition of an oxetane compound in the ink. Thus, it is submitted that the anticipation rejection based on Hermann is overcome by the amendment to claim 1.

Thus, the remaining rejections applicable to the ink of amended claim 1 having the oxetane compound are a) the anticipation rejection based on Watanabe and the obviousness rejections based on the combination of b) Maeda and Roth, c) Maeda and Sato, d) Maeda and Hermann, e) Hermann and Watanabe, f) Sato and Watanabe, or g) Roth and Watanabe.

3. The viscosity of the ink of the present invention is not taught by Watanabe, Hermann, Sato, or Maeda

Original claim 9 contained a typographical error and recited that the ink of the present invention has a viscosity of "at least" 50 mPa·s. As explained above, claim 1 has been amended to correctly recite that the viscosity is "not more than" 50 mPa·s based on the accurate description of the viscosity at page 18, lines 9-11 of the application.

Roth is the only cited reference that teaches a viscosity that overlaps the claimed range (see col. 12, lines 3-4). Watanabe and Maeda do not specify a viscosity value for their compositions. Sato teaches a viscosity of 100-300 Pa·s (par. 91, equivalent to 100,000-300,000 mPa·s), which falls far above the claimed range. The viscosity of Hermann is 1-20 mm²/sec (col. 7, lines 46-48), which cannot be mathematically equated to the claimed viscosity.

4. The Declaration of Mr. Nobumasa Sasa

It is believed that Watanabe and Roth are the closest prior art after the amendments to claim 1, thus, Applicant has performed tests and has provided the test results in the enclosed Declaration. These tests were performed to demonstrate that a) the ink of Watanabe does not inherently satisfy the claimed viscosity range and to show b) the unexpected results

that are obtained based on the addition of an oxetane compound (such as Maeda) to the ink of Roth.

- a. Mr. Sasa has demonstrated that the ink of Watanabe does not inherently teach the claimed viscosity

Mr. Sasa tested the ink of one of the examples of Watanabe to determine whether the ink inherently satisfies the viscosity limitation of the present invention. It is noted that the Declaration is presently unexecuted, however, the information contained in the Declaration originated with Mr. Sasa and is therefore entirely reliable. An executed copy of the Declaration will be filed as soon as it is available.

As described in par. 4 of the enclosed Declaration, Mr. Sasa prepared Comparative Ink 1 in accordance with Example 4 in col. 16 of Watanabe. The viscosity of Comparative Ink 1 was measured and the measurement is shown in Table B of the Declaration.

As shown in Table B, the viscosity of Comparative Ink 1 was 400 mPa:s at 23 °C. This viscosity value falls far above the range of amended claim 1. Applicant therefore submits that the enclosed Declaration demonstrates that the ink of Watanabe does not inherently teach the claimed viscosity.

b. Mr. Sasa has demonstrated that unexpected results are obtained when an oxetane compound is added to the ink of Roth

Mr. Sasa performed tests to show the unexpected results that are obtained when an ink has an epoxidized aliphatic acid ester and an oxetane compound.

Comparative Ink 2 of the Declaration was prepared in accordance with Example 1 in col. 12 of Roth as described in par. 5 of the Declaration. Table 1 of the Declaration shows that Comparative Ink 2 contained a colorant, but no oxetane compound, epoxidized fatty acid ester or epoxidized fatty acid glyceride. Comparative Ink 2 therefore did not fall within the scope of claim 1 as summarized in Table A of the Declaration.

Comparative Ink 3 was prepared in the same manner as Comparative Ink 2, except that Comparative Ink 3 contained an oxetane compound instead of an epoxy compound. The oxetane compound of Comparative Ink 3 was the compound 7,8-epoxy-2-oxa-5-methylspiro[3,5]-nonane employed in Comparative Ink 1 prepared in accordance with Watanabe. Although the Examiner had taken the position that it would be obvious to add the oxetane compound of Maeda to Roth, Mr. Sasa instead added the oxetane compound of Watanabe to Roth. It is believed that Comparative Example 3 represents the combination of Maeda and Roth, since an

oxetane compound has been added to Roth, albeit that it is the oxetane compound of Watanabe.

Comparative Ink 3 therefore contained a colorant and an oxetane compound, but no epoxidized fatty acid ester or epoxidized fatty acid glyceride. Comparative Ink 3 therefore did not fall within the scope of claim 1 as summarized in Table A of the Declaration.

Inventive Ink 4 was prepared in accordance with the present invention by replacing the polymerizable compound with then epoxidized aliphatic acid ester E-4030. Inventive Ink 4 therefore contained a colorant, an oxetane compound and an epoxidized aliphatic acid ester. Inventive Ink 4 is representative of claim 1 as summarized in Table A of the Declaration.

Mr. Sasa determined that the viscosity of Comparative Ink 2, Comparative Ink 3 and Inventive Ink 4 is within the scope of the present invention as shown in Table B of the Declaration.

Mr. Sasa further evaluated Comparative Ink 1, Comparative Ink 2, Comparative Ink 3 and Inventive Ink 4 to determine the storage stability and effect of the inks on human skin. The results of these evaluations are shown in Table B of the Declaration.

As shown in Table B, Inventive Ink 4 had superior storage stability and safety characteristics compared to Comparative Ink

1, Comparative Ink 2 and Comparative Ink 3. Specifically, the viscosity of Inventive Ink 4 varied by less than 2.0 mPa·s after storage (A rating) and no skin change was observed when Inventive Ink 4 was adhered to the skin. In contrast, the viscosity of Comparative Ink 1, Comparative Ink 2 and Comparative Ink 3 varied by more than 5.0 mPa·s after storage (C rating) and skin either turned reddish brown or blistered when the inks were adhered.

Mr. Sasa declared in par. 12 of the Declaration that he believes that those skilled in the art would be surprised by the superiority of Inventive Ink 4 because it would not be expected that a superior ink would be obtained when the ink has an epoxidized aliphatic ester and an oxetane compound.

Applicant therefore respectfully submits that the present invention is not obvious based on the combination of Roth and Maeda. Mr. Sasa has demonstrated that a superior ink is obtained when the ink contains an epoxidized aliphatic acid ester and an oxetane compound. It is believed that this superiority is unexpected based on the teachings of the cited art.

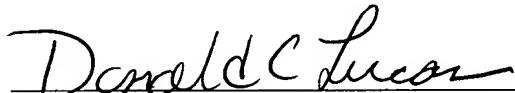
F. Conclusion

In view of the foregoing and the enclosed, it is respectfully submitted that the application is in condition for allowance and such action is respectfully requested. Should any extensions of time or fees be necessary in order to maintain this Application in pending condition, appropriate requests are hereby made and authorization is given to debit Account # 02-2275.

Respectfully submitted,

LUCAS & MERCANTI, LLP

By:


Donald C. Lucas, 31,275
Attorney for Applicant(s)
475 Park Avenue South, 15th Floor
New York, NY 10016
Tel. # 212-661-8000

Encl: Certified English translation of priority document
Declaration of Mr. Nobumasa Sasa
Return receipt postcard